

IN THE CLAIMS

1 1. (currently amended) A method for maintaining cache coherency in a
2 system having a first controller and a second controller, comprising:
3 selecting a mirror cache line in a second controller to copy data into;
4 mirroring the data from a cache line in a first controller to the mirror cache line in
5 the second controller; and
6 sending a message from the first controller to the second controller informing the
7 second controller of cache meta data associated with data in the mirror cache line.

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1 2. (original) The method of claim 1, wherein the first controller has
2 information about the content of the second controller's cache, and the second controller
3 has information about the content of the first controller's cache.

1 3. (currently amended) The method of claim 1, wherein the cache meta data
2 includes a logical unit number, a logical block number, a dirty bit map, and a cache
3 identifier for the data associated with the mirror cache line.

1 4. (currently amended) The method of claim 1 further comprising placing
2 the address of the mirror cache line into a hash table of the first controller ~~the first~~
3 ~~controller's hash table~~.

1 5. (currently amended) The method of claim 1 further comprising placing an
2 [[the]] address of the mirror cache line into the first controller's write back queue.

1 6. (original) The method of claim 1 further comprising managing a free list
2 of mirror locations in the second controller's cache by the first controller, and managing a
3 free list of mirror locations in the first controller's cache by the second controller,
4 wherein the first and second controllers can copy data into the second and first
5 controller's mirror locations, respectively.

1 7. (original) The method of claim 1, further comprising sending a message
2 from the first controller to the second controller, requesting ownership of a cache line
3 owned by the second controller.

1 8. (original) The method of claim 7, further comprising granting ownership
2 of a cache line owned by the second controller, to the first controller, wherein,
3 subsequent to the first controller receiving data that is to be mirrored to the second
4 controller cache line, transferring data to the second controller's cache line from the first
5 controller.

1 9. (currently amended) The method of claim 8, further comprising sending a
2 message from the first controller to the second controller providing the second controller
3 with [[of]] data in cache meta data associated with the mirror cache line.

1 10. (original) The method of claim 1, further comprising switching ownership
2 of cache lines between the first controller and the second controller.

1 11. (original) The method of claim 1, further comprising, during failback,
2 transferring cache lines from a survivor controller that owns a substantial number of
3 mirror cache lines, to a replacement controller unit.

1 12. (original) The method of claim 1, further comprising, sending a message
2 to a controller of a mirror cache line, informing the controller that the associated cache
3 line will be flushed and the data associated with the mirror cache line will be temporarily
4 invalid.

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1 13. (currently amended) The method of claim 12, wherein sending the
2 message to the controller of the mirror cache line further comprises[[,]] informing the
3 controller that after the associated cache line is flushed ~~destaged~~, and the mirror cache
4 line's data is consistent with a backing disk and need not be written to the backing disk in
5 the event of a failover.

1 14. (currently amended) The method of claim 1, further comprising[[,]]
2 indicating to the first and second controllers ~~controller~~ that a cache line that has been
3 flushed of data[[,]] is available for reuse.

1 15. (currently amended) A controller system for maintaining cache
2 coherency, comprising:
3 a disk array,
4 a first controller, coupled to the disk array, for selecting a mirror cache line on a
5 second controller; and
6 an interface for mirroring the data from a first controller cache line to the second
7 controller cache line;
8 wherein a message is sent from the first controller to the second controller
9 informing the second controller about cache meta data associated with data in the mirror
10 cache line.

1 16. (original) The controller system of claim 15 wherein the first controller
2 has information about the content of the second controller's cache, and the second
3 controller has information about the content of the first controller's cache.

1 17. (currently amended) The controller system of claim 15, wherein the cache
2 meta data includes a logical unit number, a logical block number, a dirty bit map, and a
3 cache identifier associated with the mirror cache line.

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1 18. (currently amended) The controller system of claim 15 further comprising
2 the first controller placing an [[the]] address of the mirror cache line into a hash table of
3 the first controller ~~the first controller's hash table~~.

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1 19. (currently amended) The controller system of claim 15 further comprising
2 the first controller placing an [[the]] address of the mirror cache line into a write back
3 queue of the first controller ~~the first controller's write back queue~~.

1 20. (original) The controller system of claim 15 further comprising the first
2 controller managing a free list of mirror locations in the second controller's cache, and
3 the second controller managing a free list of mirror locations in the first controller's
4 cache, wherein the first and the second controller can copy data into the second and the
5 first controller mirror locations, respectively.

1 21. (original) The controller system of claim 15, further comprising the first
2 controller sending a message to the second controller, requesting ownership of a cache
3 line owned by the second controller.

1 22. (original) The controller system of claim 21, wherein the second
2 controller sends a message granting ownership of a cache line owned by the second
3 controller, to the first controller, wherein, subsequent to the first controller receiving data
4 that is to be mirrored to the second controller cache line, transferring that data to the
5 second controller's cache line from the first controller.

1 23. (currently amended) The controller system of claim 22, further
2 comprising the first controller sending a message [[from]] to the second controller
3 informing the second controller of cache meta data associated with data in the mirror
4 cache line.

1 24. (original) The controller system of claim 15, wherein the first and second
2 controllers switch ownership of cache lines.

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1 25. (original) The controller system of claim 15, further comprising, during
2 failback, a survivor controller that owns a substantial number of mirror cache lines
3 transfers associated cache lines to a replacement controller unit.

1 26. (original) The controller system of claim 15, wherein a message is sent to
2 a controller of a mirror cache line, informing the controller that the associated cache line
3 will be flushed and the data associated with the mirror cache line will be temporarily
4 invalid.

1 27. (currently amended) The controller system of claim 26, wherein the
2 message that is sent to the controller of the mirror cache line further comprises[[,]]
3 informing the controller that after the associated cache line is flushed ~~destaged~~, the mirror
4 cache line's data is consistent with a backing disk and need not be written to the backing
5 disk in the event of a failover.

1 28. (currently amended) The controller system of claim 15, further
2 comprising[[,]] indicating to the first and second controllers ~~controller~~ that a cache line
3 that has been flushed of data is available for reuse.

29. (currently amended) An article of manufacture comprising a program
storage medium readable by a computer, the medium tangibly embodying one or more
programs of instructions executable by the computer to perform a method for maintaining
cache coherency, the method comprising:

selecting a mirror cache line in a second controller to copy data into;
mirroring the data from a cache line in a first controller to data in the mirror cache
line in the second controller; and
sending a message from the first controller to the second controller informing the
second controller of cache meta data associated with the mirror cache line.

30. (currently amended) A storage system for maintaining cache coherency,
comprising:

means for selecting a mirror cache line in a second controller to copy data into;
means for mirroring the data from a cache line in a first controller to data in the
mirror cache line in the second controller; and
means for sending a message from the first controller to the second controller
informing the second controller of cache meta data associated with the mirror cache line.
